Border 2020 Highlights Report 2018

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CONTENT

GOAL 1. REDUCE AIR POLLUTION

Energy Efficiency Workshop in Municipal Public Lighting Systems of Tamaulipas

Energy efficiency in Mexico has become a strategy at all levels of government aimed to improve and build long term sustainability within their public buildings and enhance security of their energy supply while minimizing the impact to the environment. The operation and installations of public lighting systems and the consumption of energy in public buildings represents one of the greatest expenses faced by municipalities, sometimes reaching up to 40% of their costs. This factor limits the ability for local governments to focus on other priorities and efforts. Through a Border grant, the State of Tamaulipas' Ministry of Urban Development and Environment held two training workshops on energy efficiency to 10 border municipalities within the state. Workshops' materials provided information on the basic tools needed to achieve greater energy efficiency in lighting public spaces, thus increasing their economic savings.

The workshops were part of a series of actions to improve energy efficiency in the state, including two energy forums: "First State Energy Forum: Tamaulipas, Energy that moves to Mexico" and the third International Congress on Renewable Energies: "Perspectives of Energy in Mexico". Coinciding with the Border project, the State launched a demonstration wind project which included the start of operations of four wind turbines, again with the aim to promote the use of renewable energies within the State. The State also distributed over 10,000 booklets, "Practical Guidelines for Energy Savings," to help raise awareness in communities on the benefits of installing environmentally friendly technologies in their homes. As a result of the workshops, 10 municipalities committed to carry out an energy audit in their buildings, benefitting a population of 1.7 million residents.

Healthy and Resilient Housing in the western area of Ciudad Juárez, Chihuahua

Low-income families often face limited access to resources that encourage energy and water savings for their homes. This is often due to either a lack of knowledge, technical assistance, or financial resources available to them. The lack of access to financing that will help meet their economic needs, limits access to clean energy technologies and services that have less impact on the environment. The Mexican not-for-profit Federation of Private Associations of Health and Community Development (Salud y Desarrollo Comunitario de Cd. Juárez, A.C. [FEMAP]), has been operating a Micro-Credit Program in the region for more than 30 years, during which time it has granted more than 40,000 small loans to low-income residents for home improvements.

With the support of the Border 2020 Program, FEMAP developed a project to identify and implement green infrastructure and energy saving elements to low-income families looking to improve their homes within a rapidly growing area of Ciudad Juarez. The project offered technical and financial assistance to 50 homes (202 persons) implementing these energy efficient materials and strategies. In coordination with academic, non-profit and private business, the residents had access to technical experts who guided and educated them on green infrastructure elements that could be incorporated and adopted by them, as well as, access to eco-friendly materials.

The project resulted in an energy cost savings of $630 or 11.249 Kw/hr and water savings of 140,000 gallons of water or $500 following improvements of the 45 of 50 homes by installing:

- over 250 led bulbs

- 200 windows sealed
- 50 low-flow shower heads
- 50 drinking water filters
- X (Maria add number) roof and wall insulations

In addition to the improvements made directly to their homes, a catalog of eco-materials was developed with the support of academics of the Architecture Program from the Autonomous University of Ciudad Juárez. This catalog includes information on best practices and an evaluation of each of the selected ecotechnologies, identifying those that are viable for implementation in marginalized communities since the existing catalogs are mainly focused on new housing.

Quantifying Emission Reduction from Reduced Wait Times at Mariposa Port of Entry

The Mariposa Port of Entry (POE) in Nogales, Arizona is an important land port in the U.S., with over 7 million vehicle crossings per year, including 350,000 truck crossings. The POE is piloting an innovative program to conduct joint inspections with Mexico and United States inspectors in order to reduce commercial truck wait times at the Nogales, Arizona Border. This pilot program is expected to significantly reduce wait times, from 8 hours to 1 hour, for northbound cargo trucks. This reduction in wait times will reduce emissions from idling vehicles and accelerate commerce. Nogales is currently in non-attainment for PM_{10} and $PM_{2.5}$, which can cause respiratory and cardiac effects, especially in older adults and young children. The emissions reductions from these mobile sources may improve air quality and public health in the region.

Border 2020 has funded the North American Research Partnership to study the amount of emission reduction benefits from this pilot project. Over 400 vehicles were surveyed for information about wait times and vehicle make and model, which allowed researchers to calculate emissions.

EPA's Motor Vehicle Emissions Simulator (MOVES), a modeling system that estimates emissions for mobile sources at the national, county and project level for criteria air pollutants, is being used by researchers to quantify emission reductions from border wait times. Preliminary data shows that decreased wait times have reduced emissions from idling. In addition, reductions are occurring because vehicles processed through the Unified Cargo Processing Facility tend to be newer and are built with more emission reduction technologies. The North American Research Partnership is currently working on data analysis of the surveys and emission reduction quantification and the final report will be available in late 2018.

Reducing Asthma Triggers for Children through In-home Interventions

The children of Imperial County, California are living with high concentrations of asthma triggers in the indoor and outdoor environment, including cross border air pollution. These factors have contributed to Imperial County experiencing some of the highest rates of asthma emergency room (ER) visits in California.

To address this issue, the Border 2020 Program has partnered with and funded the Imperial Valley Child Asthma Program (IVCAP) from 2015-2017 to conduct in-home asthma interventions and work with housing maintenance workers on implementing healthy homes strategies. During this period, 94% of participants

enrolled in the program reported no ER visits or hospitalizations. In addition, IVCAP reached over 2,000 people through outreach and education, program enrollment, and other community engagement activities.

EPA continues to support and positively impact low-income families by funding in-home asthma interventions to IVCAP by a Clean Air Act asthma grant. The 2017 funding has a goal to provide in-home environmental asthma assessments and tools to manage asthma triggers for families and children 17 and under. These home environmental observations will be carried out by *promotoras*, community health workers.

To date, IVCAP has enrolled almost 90 additional asthmatics into their program with 80% of them reducing, avoiding, and/or eliminating two or more triggers identified after IVCAP's home environmental assessment. Families received tailored interventions for their unique set of triggers in their homes.

By the end of this 2017-18 effort, IVCAP hopes to reach up to 70 families and to conduct in-home asthma interventions. These interventions will decrease ER visits and hospitalizations. In addition to in-home visits, IVCAP will raise awareness by conducting outreach and educating residents living with asthma on the benefits of improving the indoor home environment to maintain long term control of asthma. For more information on asthma and environmental triggers, please visit: www.epa.gov/asthma.

GOAL 2: IMPROVE ACCESS TO CLEAN AND SAFE WATER

U.S.-Mexico Border Water Infrastructure Program

The Environmental Protection Agency's U.S.-Mexico Border Water Infrastructure Program (BWIP) funds the planning, design, and construction of high priority water and wastewater infrastructure along the U.S.-Mexico border. BWIP assists disadvantaged communities in identifying and securing available funding sources and addressing funding gaps to ensure access to safe drinking water and adequate sanitation, often for the first time.

BWIP provides hands-on management and technical oversight for communities lacking technical and managerial capacity that can then complete project planning and design requirements, increasing funding opportunities for construction assistance from other programs, such as Texas' Economically Distressed Areas Program, the State Revolving Fund, United States Department of Agriculture's (USDA) Rural Development Water and Environmental Programs, and the North American Development Bank (NADB).

Rivers along the U.S.-Mexico border sometimes naturally define the international boundary like the Rio Grande or flow from Mexico into the U.S. such as the Tijuana River. Projects funded under the BWIP address transboundary sewage discharges between the two countries. Treating raw sewage at the source before it enters shared border water bodies is the most technically feasible and financially viable option to prevent transboundary contamination. As part of this partnership, Mexico matches EPA's project's investments dollar for dollar, which helps protect public health and the environment.

Program Accomplishments

Since 2003, through 108 projects funded, the program has provided access to safe drinking water to 70,000 homes and first-time wastewater collection and treatment to 673,000 homes. In 2017, through the North American Development Bank (NADB), EPA announced a new project application cycle for BWIP funding. This

identified 61 eligible drinking water and wastewater projects with a total estimated construction cost of $296 million that address public health and environmental conditions along the U.S.-Mexico border.

Building technical and managerial capacity at Sunland Park, New Mexico through partnerships

The construction of a new treatment plant in Sunland Park, a small and disadvantaged community in New Mexico, started in August 2017. Camino Real Regional Utility Authority (CRRUA), the local wastewater utility, struggled with inadequate and aging infrastructure, environmental compliance, and lack of managerial capacity and resources. For close to two years, EPA, New Mexico Environment Department (NMED) and NADB, worked closely with CRRUA to implement a capacity building plan to ensure CRRUA could effectively manage a new wastewater treatment plant. EPA provided more than $816,000 to implement this plan and technical assistance for project planning and design. The plan was successfully implemented; EPA and NMED then funded the construction of a $12.7 million treatment plant. EPA contributed with $9 million and NMED provided the additional $3.7 million in state funding. The treatment plant will improve access to sustainable wastewater treatment services to approximately 6,438 residents of Sunland Park and Santa Teresa and will greatly reduce the risks of untreated or inadequately treated wastewater discharges.

CRRUA's board chair, Josh Orozco, stressed the importance of finally being able to provide adequate wastewater treatment capacity in the community. During the July 2017 groundbreaking ceremony, he said this new plant "...will not only allow more homes and more businesses to be helped, but will also improve the health of our community."

Protecting the Tijuana River Watershed from transboundary contamination

The Tijuana River, originating in Baja California, Mexico, crosses the U.S.-Mexico border in San Ysidro, California, and empties into the Pacific Ocean just south of Imperial Beach, California. Discharges of raw and poorly treated sewage in Tijuana can impact the economy, health, and environment of U.S. communities like Imperial Beach and Chula Vista in San Diego County. As part of a multi-stakeholder and long-term effort to address these transboundary spills, a BWIP project is underway to repair some of the deteriorating wastewater collectors. These collectors carry sewage from households to the Tijuana wastewater treatment plant. If these collectors are not repaired, catastrophic collapses could occur, resulting in hundreds of millions of gallons of untreated sewage flowing into the U.S. and onto San Diego County beaches. The existing partnership between EPA and Mexico's water agencies, provided $7 million for the repair of more than 6 miles of sewage collectors and rehabilitated 30 manholes. A second phase for the construction of 2.5 miles of additional sewage lines is underway. The estimated cost of this project is $3 million with a projected EPA contribution of $1.4 million.

Fat, Oil and Grease Public Outreach Campaign in Brownsville

The Brownsville Public Utilities Board (BPUB) was awarded a Border 2020 grant for $25,000 in February 2016 to provide outreach and education on the impact of Fat, Oil and Grease (FOG) pollution on water quality to the communities in Brownsville, Texas and Matamoros, Tamaulipas. Historically, at the BPUB, FOG residential and commercial service calls occurred on average five times a week, with increased occurrences during the month of December.

BPUB entered a voluntary reduction program with the Texas Commission on Environmental Quality (TCEQ), Sanitary Sewer Overflow Initiative. This voluntary program requires BPUB to work on reducing unauthorized discharge of untreated or partially treated wastewater from the collection system or its components (e.g.

manhole, lift station, or cleanout) before reaching a wastewater treatment facility as a result of FOG issues. Through educational campaign efforts to both the general public and to commercial establishments, the BPUB aimed to reduce the number of FOG related service calls and bring awareness about the proper disposal techniques in dealing with Fat, Oil and Grease.

Marketing & Education efforts:

On March 16, 2016, the BPUB officially kicked-off its "Fat, Oil and Grease" public outreach campaign at its monthly public meeting in Brownsville. During the public meeting, they announced their collaboration with the City of Matamoros on the new FOG outreach program. BPUB reached communities from both sides of the border through a number of activities that included advertisements, educational fliers, ad videos, workshops, and press coverage. Social media platforms such as Facebook, Twitter and YouTube (www.youtube.com/watch?time_continue=55&v=AL8PFo35Atc), were also utilized to target younger audiences and share the educational video and audio campaigns that were developed. Throughout the project period, over 80 public outreach events and trainings with over 1,700 participants were conducted to the public in apartment and housing complexes, churches and educational institutions, as well as, commercial business.

More importantly, the BPUB through its outreach efforts has consistently been reducing the number of FOG service calls from 731 in 2013 to 417 in 2016, a 43% reduction in just four years. During the project period, in 2015 and 2016, the BPUB received 477 and 417 services calls related to FOG pollutants, respectively. Overall, the project met its objectives, including, reducing the number of FOG related calls 13% or 60 calls. To continue to learn more about BPUB's FOG efforts visit: www.brownsville-pub.com/departments/water-wastewater/pretreatment

Building Green Infrastructure in the Valle del Sol Avenue Public Space

The border region of El Paso and Juarez lacks urban green spaces. The World Health (WHO) established a sustainability indicator where a green area exists 9 m^2 per inhabitant, where Juarez is estimated to only have 4.5 m^2. Since 2013, Juarez has actively been partnering with various organizations to increase green infrastructure and expand green spaces throughout the city. These projects not only can be cost-effective but can address flooding issues associated with a lack of stormwater infrastructure and beautify areas that see high pedestrian traffic.

In 2016, a Border 2020 grant helped fund a park located on Valle del Sol Avenue and Solares Street, located over a half a mile from the U.S.-Mexico boundary. The park is the only green space in the area available to the community. Over many years, the park had heavily degraded due to a lack of maintenance and no longer served as an area where the community members could gather. The Instituto Tecnológico de Ciudad Juárez (ITCJ) who received the border funding transformed the park back to a usable space for community members, but also addressed flooding issues that this area experienced during rain events.

With funds granted by the Border 2020 Program, the ITCJ developed this project with the following objectives:

- Establish passive rainwater harvesting systems;
- Conserve water used for watering;
- Protect the soil from wind erosion;
- Incorporate and take advantage of the existing urban infrastructure.

The project began in June 2016 with the cleaning of the site and the reconditioning of the sidewalk, the construction of passive systems for rainwater collection, as well as the recovery and reconfiguration of existing vegetation. The amount of rainfall monitored from July 2016 to November 2017 (17 months) captured a total volume of 472, 502 U.S. gallons of rainwater.

Presently, the passive water collection systems continue to function effectively and the vegetation is thriving. The park is supported almost entirely with rainwater except in cases of extreme water stress or for the initial support of some new plant seedlings.

Thanks to a donation from the municipal authority, the park soil is protected from wind erosion by a walnut shell cover which allows any moisture in the soil to be conserved.

Finally, surveys conducted in the area showed that the social value of the park increased substantially. Before the project, the space was viewed as a negative area within the community and now it is seen as a usable social gathering park.

Determining the Ideal Bioswale Porous Material for South Texas Stormwater Management

A number of communities in the Lower Rio Grande Valley in southern Texas have been evaluating various Low Impact Development (LID) methods to incorporate into their communities. LID provides several advantages over traditional stormwater management practices such as: reducing or eliminating the need for large retention ponds; decreasing pollution to receiving waters; lessening erosion; more visually appealing within the community; flexibility in the layout of projects; and lowering cost. A research team under the direction of Dr. Jungseok Ho, of the University of Texas Rio Grande Valley (UTRGV), evaluated the use of bioswales in parking lots to determine the best performing locally available bioswale porous media material as well as design a bioswale standard that could be used by communities in the region. Bioswales are generally designed to manage runoff from large impervious surfaces such as parking lots. Bioswales incorporate engineered porous soils and/or other landscape elements to remove debris and pollution from surface runoff.

Building on previous studies Dr. Ho conducted, his team evaluated five testing sites (Table 1) that utilized various bioswale porous media (no bioswale, pumice, manufactured sand, recycled crushed glass and natural sand) in parking lots on the UTRGV Edinburg campus.

Figure 2 indicates the hydrological performance of the four different materials used at the five testing sites. Field testing indicating, Site 2 with the Pumice material, showed the best hydrologic performance taking into account the four decision criteria of runoff volume reduction, peak flowrate reduction, peaktime attenuation, and runoff solids filtration. Pumice showed the highest filtration of the materials with 58% (Figure 2d) and a peaktime attenuation of 64% (Figure 2c). Manufactured sand material showed very similar performances with natural sand material among the volume reduction, peak flowrate reduction, and peaktime attenuation. Recycled crushed glass was also a competitive material for all the criteria except peaktime attenuation which was only 32%.

The soil column test (Figure 3) results show that any mixtures containing pumice more than 40% of the volume produced promising results. Three 40% pumice mixtures (with manufactured sand, natural sand, and recycled crushed glass) achieved 30% of specific retention and 52% of filtration on average.

Overall, based on the field testing, pumice performed the best of the bioswale porous medias, with testing showing that at least 40% pumice material mix is the ideal material for this region. However, it should be noted that further studies need to be conducted to consider the local availability, cost of the material and project construction to determine the overall practicality to be used by the communities.

Green Infrastructure for Sediment Control and Flood Protection in Ambos Nogales

The International Outfall Interceptor (IOI) is an aging pipeline that conveys untreated sewage from Nogales, Sonora and Nogales, Arizona (Ambos Nogales) to the Nogales International Wastewater Treatment Plant nine miles north of the border in Rio Rico, Arizona. Since the wastewater collection system in Sonora acts as a combined sanitary-stormwater conveyance, over the years sediment inflows and infiltration of stormwater in Sonora have caused failure of the IOI in Arizona. Erosion (scouring) from the sediment has weakened the conveyance system resulting in breaks in the IOI, most recently in July 2017, leading to sewage spills into the Nogales Wash. Repeated failure of the IOI could result in contamination of Arizona groundwater resources.

The Watershed Management Group (WMG), a Tucson-based non-profit, led a Border 2020 funded project to demonstrate the potential of green infrastructure (GI) to diminish the amount of sediment during flood events that is scouring the IOI. Green infrastructure, according to EPA, uses vegetation, soils, and other elements and practices to restore some of the natural processes required to manage water and create healthier urban environments. The project used a three-pronged approach including:

- capacity building (community trainings in planning, design and implementation activities)
- demonstration sites (two projects for sediment control)
- policy development (resolution to expand and strengthen GI practices in Nogales, Sonora)

Working with local government and Nogales, Sonora residents, WMG completed two demonstration sites covering close to 10,000 m^2, similar to the area of a large soccer field. In addition, 88 residents attended a training and over 500 community members were informed about green infrastructure concepts via community events and project participation. One demonstration site is a rain park that now harvests a volume of 50,000-70,000 liters of rainfall per rain event. These GI modifications will nearly eliminate the park's contribution to flood events downstream in the Ambos Nogales area.

The project attracted support from a Nogales member of the Sonora Congress, who is also on the State of Sonora Commission for Energy, Environment and Climate Change. This project moved beyond the local level, spurring the Sonora Congress to adopt a green infrastructure law in April of 2017, the first of its kind approved in Mexico.

This project increased community capacity to use green infrastructure to reduce flooding in the Ambos Nogales area and prompted the local government to support future green infrastructure development.

Protecting the City of Holtville's Water Resources in Imperial County, California

Located in Imperial County, the City of Holtville's wastewater treatment plant (WWTP) was not meeting discharge requirements for ammonia and other pollutants that were flowing into the Pear Drain, which feeds

the Alamo River and ultimately the Salton Sea in southern California. Thanks to funding from EPA's Border Water Infrastructure Program and the State of California Clean Water State Revolving Fund, the existing WWTP was upgraded and now provides wastewater service to 100% of the service area or 6,594 residents of Holtville.

Already considered an impaired water body, the polluted discharges from Holtville exacerbated the treacherous conditions faced by wildlife and plant communities living in the Salton Sea. Over the years, water levels in the Salton Sea have dropped rapidly due to evaporation and have increased salinity and pollutant concentrations. The exposed lakebed has succumbed to desert winds that now carry polluted dust onto the surrounding communities. These dust particles may contribute to asthma attacks throughout Imperial Valley. The Holtville WWTP that now meets discharge requirements will not only increase the chances of survival for the various organisms dependent on the sea, but the influx of properly treated water will keep dust from being exposed to the wind and away from vulnerable urban residents.

Some of the new components installed in the Holtville WWTP include an automatic bar screen that maximizes the removal of large objects and an activated sludge system enhancing treatment effectiveness and improving the quality of the effluent. A rehabilitated operations building within the treatment plant was also equipped with modern lab equipment, ensuring that tested effluent meets discharge requirements.

"EPA is committed to helping communities across Imperial Valley protect the state's vital water resources" said U.S. EPA Region 9's Water Division Director, Tomás Torres. "Our investments renew aging infrastructure, which can be costly for smaller communities like Holtville."

GOAL 3: PROMOTE MATERIALS, WASTE MANAGEMENT, AND CLEAN SITES

End-of-Life Vehicle Guide

Every year vehicles are stockpiled along the U.S.-Mexico border when they reach the end of their useful lives. Often, these stockpiled vehicles have not been processed properly to recover the reusable or recyclable materials nor dispose of hazardous materials these vehicles have. As the discarded vehicles are piled up, they become an eyesore to the local communities and pose a risk to human health and the environment. The vehicles often contain hazardous materials like antifreeze, used oil, or lead and when abandoned, they become a liability to local governments.

In response to address the needs of auto recyclers in the border region, USEPA and SEMARNAT have produced an End-of-life Vehicle Guide (Guide). The Guide was created to share effective practices for preparing an end-of-life vehicle so that the vehicle can be recycled properly and contribute to the U.S.-Mexico Border 2020 Program's goal to reduce waste through the safe and responsible recovery of materials.

The Guide and other materials form a packet comprising the guide, a set of quick reference waste cards, and a poster. These resources can be used to inform handling facilities and technicians on prepping the vehicles for processing in an environmentally sound manner. Additionally, the Guide discusses responsible disposal, cost recovery, health, safety and security, industry standards, and a listing of vehicles containing mercury switches.

Specific waste streams that pose a high risk to workers and the environment are highlighted in the Guide and on a set of waste cards complete with diagrams. Waste streams include: lead, mercury switches, refrigerants,

waste batteries, waste fluids and waste fuel. Overall, the Guide provides materials that technicians can use to dispose of old vehicles using environmentally sound management practices.

EPA and SEMARNAT will work together to disseminate the folders to the relevant stakeholders along the border region in the fall of 2018. All materials are available in both English and Spanish. Please see link below for more information the Guide: **link to be added.**

Scrap Tires and Solid Waste Management along the U.S.-Mexico Border

The Border 2020 Program has aimed at building a more sustainable, integrated approach to waste materials management to minimize and/or reduce the impact to the environment and improve public health. However, in a geographic region where population, socio-economic conditions and environmental regulations can vary significantly from one region to another, different border communities have had to take varying and creative approaches to build sustainable communities.

City of Pharr, Texas.

Over the years, the City of Pharr has implemented greater sustainability tools within the Public Works Department to make the city one of the cleanest cities in the Lower Rio Grande Valley. In 2016, Pharr received a Border 2020 grant for $36,390 with the goal to continue improving their recycling and education efforts within the community to reduce the city's dependency on landfills and build a healthier community. Through the grant cycle over a 14-month period, the city collected:

- over 5,700 scrap tires;
- 60 tons of mixed waste (Figure 1);
- 1,023,353 lbs. of recycled material diverted from the landfill.

Staff launched a bilingual public education campaign by promoting, the city's recycling and sustainability efforts, stormwater pollution and illegal dumping of scrap tires, through social media, brochures, public service announcements and over 100 outreach activities (20 meetings, 40 events, 50 presentations). The project also increased recycling efforts in some Pharr schools by promoting an environmental education contest and providing 75 recycling bins for school classrooms and 26 larger 95-gallon recycling bins within the school district. To learn more about Pharr's Public Work Department and their efforts, please visit: pharr-tx.gov/departments/public-works/pharr-recycling-center/

Valle Hermoso and Rio Bravo, Tamaulipas.

In 2014, Tamaulipas passed a state legislation that outlined the State's Program for Integrated Waste Management and Prevention approach. Within this program, based on factors such as population growth and solid waste generated per capita, the State prioritized municipalities where it was vital to establish a municipal integrated waste management and prevention program. The State Program outlined specific strategies and actions that these municipal plans should address, including short, medium and long-term implementation and associated costs. The implementation of the municipal plans is done in three phases, where the first two phases look at conducting a diagnostic of current conditions regarding solid waste management in the municipality and adoption by the municipality to formally present and register the plan through the state. The third phase, is the implementation, monitoring and evaluation of the municipal program.

The State Secretariat for Urban Development and Environment in Tamaulipas (Secretaría de Desarrollo Urbano y Medio Ambiente del Gobierno [SEDUMA]) received a $20,000 Border grant to assist the municipalities of Valle Hermoso and Rio Bravo complete their diagnostic study on local waste management. The diagnostic study, which took place over a two-month period, looked at:

- Current operations, staff, equipment, solid waste collected and classification of waste;
- Specific strategies recommended to be implemented over a short, medium, long term period;
- Costs associated with implementation of strategies (Table 1);
- Monitoring program parameters; and
- Potential funding mechanisms.

On August 22, 2016, SEDUMA presented both municipalities with the diagnostic assessment of their current waste management system. In March 2017, Valle Hermoso officially published and registered the diagnostic assessment with the State, moving into the third phase. Next steps, include the municipality of Rio Bravo's city council approval of the assessment and registration of the program.

Addressing the Binational Challenges of Electronic Waste in Texas and Coahuila

Rapid advancements in technology and the use of electronics by consumers mean that more and more electronic products are quickly seen as obsolete and disposed. Unlike other recyclable materials, electronic waste (e-waste) is not as easily recyclable due to the toxic metals (lead, mercury, cadmium and arsenic) found in them. The challenge with recycling e-waste is often improper disposal in local landfills and the lack of infrastructure in communities to properly support handling and recycling.

In 2016, through two Border 2020 grants, one to the Secretary of Environment of the State of Coahuila (Secretaría de Medio Ambiente [SEMA]) and the other to Green Tec-osos, an environmental group within the Instituto Tecnológico de Piedras Negras, recycling e-waste projects were launched in the communities of Ciudad Acuña, Piedras Negras and Guerrero, in the state of Coahuila and Eagle Pass, Texas. These projects aimed to prevent the electrical and electronic waste generated in the municipalities from being illegally dumped in the Rio Grande riverbed, around the Amistad Dam, as well as in streams, vacant lots and sanitary landfills of the region. They also informed and educated the community about the benefits of reusing electronic products.

To improve sustainable practices, 10 permanent e-waste collection centers were established among the four communities. Through community events, the projects yielded the collection of over 113 tons of e-waste. In addition, with the assistance of over 60 partners through workshops, trainings and media outlets, residents were educated on the positive impacts of recycling electronic waste has on the environment.

Campo Band Advances Zero Waste Practices

In the border region, unmanaged trash causes potential transboundary impacts such as impairing water quality, clogging streamflow, and creating habitat for disease vectors. In 2015, the Campo Band Tribe, located in California, raised concerns about transboundary solid waste issues to representatives implementing the Border 2020: U.S.-Mexico Environmental Program. The Border 2020 Program provided funds {add date} to

conduct a solid waste assessment and prepare a zero-waste plan. The zero-waste plan lays the foundation for developing a zero-waste program, setting a goal to significantly reduce waste and establish diversion practices to eventually eliminate waste sent to the landfill.

The zero-waste plan was completed in January 2018. Along with the recommendations in this plan, the Campo Band is actively exploring other materials management activities including short and long-term goals to develop a self-sustaining waste and recycling program and transfer station. This plan was an important first-step/tool for the Tribe to accomplish their solid waste goals and improve the Tribe's and border region's health. The Campo Band continues to leverage other resources such as EPA's General Assistance Program (GAP) to address their solid waste goals, creating practices that makes sense for their community, and using the zero-waste plan as a valuable tool to accomplish their needs. Campo is currently funded by GAP for [$] to continue to move forward with the zero-waste plan.

Composting Diverts Valuable Organic Materials from Landfills

Compost is a valuable resource made from food waste, landscape cuttings or other organic material. However, based on the 2018 study "Characterization and Management of Organic Waste" released by the Commission on Environmental Cooperation (CEC), organics in the U.S. and Mexico are predominantly sent to landfills. Border 2020 has worked to increase diversion rates, estimated to be 32% for the U.S. and 7% for Mexico, by working with government, academic, non-profits, and industry stakeholders. Several past, and one new Border 2020 project, work to improve the management of organic waste through compost practices and EPA's food recovery hierarchy practices (food-recovery-hierarchy).

In 2012, Border 2020 awarded the organization, "Tijuana Calidad de Vida," a grant resulting in the first border municipal landscape compost pilot program that produces compost and educates future composters. In 2016, EPA Region 9's Environmental Finance Center funded a grant to identify compost niche markets in Tijuana for businesses needing to achieve waste reduction goals for their corporate social responsibility ratings. In 2017, Colegio de la Frontera Norte (COLEF) conducted a pilot program working with nearly 120 households in Tijuana and training them in a total of 27 workshops. This resulted in the diversion of 10,067 kg of household food scraps. The compost created was used at Eco-parque, a campus program to model and teach sustainable practices and 107 sacks of compost were donated to household participants. The project also affirmed the local community's willingness to change behavior to separate food scraps from other household trash signaling desire for these services. The findings of these grants were included in the CEC's 2018 report.

On June 13, 2018, the University of Arizona (UA) Compost Cats celebrated the award of a $91k Border 2020 grant to establish the Santa Cruz County (SCC) Compost Center, a much-needed alternative to landfilling waste produce. Nearly 3,000,000 tons of produce crosses the nearby Mariposa-Nogales Port of Entry, one of the busiest land crossings along the U.S.- Mexico border, bound for markets across the United States each year. About 8,000 tons of waste produce are generated yearly, equivalent to two dump trucks per day for an entire year, and is then disposed of in the Rio Rico Landfill. The new SCC compost center will offer both environmental and economic benefits to the region (Press release for compost-center). In its first year, SCC Compost Center will compost 3,000 tons of waste produce, creating 9,000 cubic yards of compost. This is equivalent to 4.3 football fields covered with one foot of compost. The goal is to compost the 8,000 tons produced annually.

The SCC Compost Center will be modeled after the successful UA Compost Cats program in Tucson, which not only composts but works with local food banks to divert good food from campus to hungry people (Compostcats link). In 2015 their work was acknowledged with EPA's "Food Recovery Challenge" award for reducing food waste on the UA main campus and in the City of Tucson. Similarly, the SCC Compost Center will serve as an agricultural learning center for high school and college students and recover this valuable resource from taking up space in the landfill.

GOAL 4: ENHANCE JOINT PREPAREDNESS FOR ENVIRONMENTAL RESPONSE

Enhance Joint Preparedness for Environmental Response under the U.S.-Mexico Border 2020 Program

Chemical and other hazardous substances emergencies do not respect international boundaries. Preparing for a possible emergency in the border region improves the ability to respond to incidents and protect the environment and public from hazards that could result in serious environmental or health impacts.

Annex II of the 1983 La Paz Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area established the Mexico-U.S. Joint Contingency Plan (JCP). The JCP provides a binational coordination mechanism for protecting human health and the environment and responding to significant chemical and oil contingencies or emergencies that affect the inland border area between the U.S. and Mexico. Two previous versions of the Mexico-U.S. JCP have been revised and updated. Most recently, on November 17, 2017, in Mexico City, the most up-to-date version of Mexico-U.S. JCP was signed by the Secretariat of Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales [SEMARNAT]), through the Office of the Federal Deputy Attorney of Industrial Inspection (Procuraduría Federal de Protección al Ambiente [PROFEPA]) and the National Coordination for Civil Protection within the Secretariat of Interior (Secretaría de Gobernación [SEGOB]). Previously, for the U.S., the Director of Office of Emergency Management (OEM) and U.S. Co-Chair for the Inland Border Plan, signed the updated JCP.

The updated JCP has a robust binational notification system that has been restructured to reflect lessons learned from actual emergencies and notification drills. The changes to the notification system were coordinated with the National Response Center (NRC), Mexico's National Communications Center (Centro Nacional de Comunicaciones / Sistema Nacional de Protección Civil [CENACOM]) and PROFEPA in Mexico City as well as with our EPA Regional colleagues in Regions 6 and 9. Extensive reviews were conducted by Office of General Counsel regulation experts, the EPA International Law office in addition to the EPA Office of International and Tribal Affairs (OITA) and the Department of State.

The ability to plan and prepare binationally improves the probability of adequately responding to incidents and protecting the environment and public from exposure to harmful contaminants and possible serious environmental or health impacts. This binational partnership is also increasing emergency response capacity through training events designed to enhance cooperation, strengthen binational contingency plans at the local, state, regional and national levels to reduce the risks of emergencies and disasters throughout the border region.

Binational Training Reduces Danger and Impacts to Border Communities

EPA has partnered with federal, state and local agencies on both sides of the border to provide exercises and training as well as to ensure that first responders have proper personal protective gear to respond safely and effectively. Since the inception of the Border 2020 program, over 10,500 firefighters, emergency management officials, police, military, industry representatives, medical staff and other relevant community leaders have received training through: 153 training courses, 32 binational exercises and 245 drill notifications between the U.S. and Mexico throughout the Arizona-Sonora and California-Baja California border region. Getting equipment and personnel in a timely manner across an international border crossing to help respond to fires has always been a challenge. It requires a coordinated effort among a wide range of agencies and organizations. Binational training and exercises with first responders, customs officials, other government agencies, military, industry and the public have laid the groundwork for efficient responses in real-life emergencies.

Binational Fire Response in Winter 2017

When a major tire fire sent dangerous billows of smoke from Agua Prieta, Sonora into Douglas, Arizona, in December 2017, Douglas firefighters crossed the border and helped put it out in four hours. Binational training and tabletop exercises conducted four months prior to the fire greatly assisted in increasing the efficiency of the response and reducing the scale and impact of the incident. Additionally, border patrol at the port of entry on both sides provided timely crossings to the binational firefighters.

The binational collaboration with the addition of the Douglas firefighters prevented the fire from growing larger and potentially crossing into the U.S. and reduced the amount of smoke that can cause respiratory problems for sensitive populations such as children, elders and those with asthma along the U.S.-Mexico border.

200-hour Training Tested by May 26, 2018 Tire Fire.

A 200-hour HAZMAT Tech training for Douglas and Agua Prieta firefighters has been ongoing on weekends and will finish up by Fall 2018. The result will be additional HAZMAT techs in Douglas and a full HAZMAT Tech team in Agua Prieta who are better trained and equipped to respond to incidents and assist each other in cross border emergencies.

On May 26 a portion of the 200-hour training was interrupted and postponed due to a binational response to a tire fire in Agua Prieta. A recently updated Sister City Binational Emergency Plan {check name} was activated and utilized for the response where the Douglas Fire Department assisted in getting the fire under control in under three hours.

"Thanks to the binational efforts and the HAZMAT class being presented to Agua Prieta Firefighters, they have been able to respond to incidents in a more prompt and efficient way. In the past, Agua Prieta Fire Department had willingly attended to fire emergencies and showed their best efforts, however, now that they are receiving the HAZMAT training by Douglas Fire Department, they understand the need of proper personal protective equipment to respond and face the risk of each event such as the tire fires. I personally saw the firefighters using the proper respiratory protection equipment during the tire fire that occurred on May 26th."– Gerardo Romo, Douglas Fire Department

"Thanks to EPA, as well as the firefighters of the city of Douglas, Arizona, who have participated as instructors to enrich our HAZMAT knowledge. With this we are prepared for any emergency. Our aim is to protect the

communities in our sister cities. Thanks to EPA for providing us with the equipment since, due to its high cost, it is out of our reach. Thanks for trusting and believing in the firefighters of Agua Prieta." –Lieutenant Jose Romero, H. Fire Department of Agua Prieta

GOAL 5: ENHANCE COMPLIANCE ASSURANCE AND ENVIRONMENTAL STEWARDSHIP

Legislative Reform and Environmental Education in Nuevo Laredo, Tamaulipas

The Universidad Autónoma de Tamaulipas received a Border 2020 grant to continue educating border communities on the environmental challenges (i.e. water pollution, urban solid waste, fats-oils-grease) that persist in this geographic region. The project focused on the following objectives:

1. Educate school students and environmental municipal inspectors about the most common environmental challenges in the region.
2. Update the municipal environmental legislation for environmental protection in Nuevo Laredo and some of the surrounding municipalities and present to the city for adoption.
3. Create an online database with the existing environmental regulations or ordinances of all the border sister cities within EPA Region 6.

The project resulted in environmental conservation training to 2360 students, 50 public school directors, and 20 environmental inspectors of the city of Nuevo Laredo. Additionally, the project aided in the development and delivery to municipal authorities a proposed new ordinance of "Territorial Ecological Planning of the Municipality of Nuevo Laredo, Tamaulipas. Lastly, the municipalities of Ciudad Mier, Camargo, Jiménez and Jaumave in Tamaulipas adopted environmental ordinances that will benefit approximately 300,000 citizens.

Port of Entry Inspectors Safeguarding Communities

Enforcing the Resource Conservation and Recovery Act's (RCRA) import/export regulations protects public health and the environment by providing safeguards against hazardous waste and materials being mishandled and spilled. It also reduces the amount of binational "scam" businesses who implement illegal practices, creating unfair business competition. EPA funds California's Department of Toxic Substances (DTSC), a Border 2020 partner, to safeguard the California U.S.-Mexico border.

DTSC and San Diego County inspectors work closely with Customs and Border Patrol (CBP) to conduct surveillance and enforce compliance to ensure hazardous materials and waste products are safely transported across the ports of entry (POE) and onward to their final destination between the U.S. and Mexico. These HAZMAT trained inspectors work with U.S. Customs HAZMAT inspectors and serve as part of the emergency response team, a first line of defense in the event of a hazardous spill or accident at the POE. DTSC and the San Diego County, upon request from CBP, also participate in special operations such as inspections of cargo outside of days and hours allowed for hazardous materials. To increase compliance, the two countries provide

compliance assistance outreach and training to facilitate the U.S. and Mexico's industries to understand regulatory requirements.

On June 20, 2018, with funding from the Border 2020 Program and RCRA program, DTSC hosted an import/export workshop in Tijuana with Mexico's environmental agency, Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT), Mexico's enforcement agency, Procuraduría Federal de Protección Ambiental (PROFEPA), and Baja CA's environmental agency, Secretaria de Protección Ambiental (SPA), for Mexican hazardous waste and special waste industrial generators operating in Baja CA. The workshop focused on import/export requirements including: transport, new electronic manifest system and verification, defining hazardous waste and materials, and differences between federal and state requirements. Nearly 200 people representing industry, government, and academia attended, demonstrating the demand for this type of information and industry willingness to comply.

Based on the last report of the U.S.-Mexico Consultative Mechanism, 33 Mexican businesses are permitted by SEMARNAT to treat, store, or dispose hazardous waste generated by the hundreds of businesses in the area. Offering these hazardous waste compliance workshops in Tijuana assists industry and informs key stakeholders on compliance requirements for U.S. regulations, ultimately protecting public health and the environment.

ENVIRONMENTAL HEALTH EFFORTS

EPA Engages Communities to Target Children's Environmental Health

According to the World Health Organization, in 2012 it was estimated that 1.7 million children under the age of five died due to the environment. Children living along the U.S.-Mexico border are particularly more vulnerable due to the region having higher than the national average rates for children living in poverty, being uninsured, and having chronic diseases (Pan American Health Organization, 2014).

Over the past several years, partnerships between EPA's Office of Children's Environmental Health, the U.S.-Mexico Border 2020 Program, U.S.-Mexico Border Health Commission under the U.S. Department of Health and Human Services, and local organizations have worked on several collaborative projects to identify environmental health needs and provide opportunities for local action to improve the lives of children living along the U.S.-Mexico border. These opportunities have included three children's health symposiums along the border from south Texas to California, as well as federal grants to educate families, community health workers, educators and medical professionals (Figure 1) on how to address children's health needs.

In 2018, EPA awarded more than $214,000 to fund five projects aimed at addressing children's environmental health in border communities in Texas, New Mexico and Arizona. These five projects addressed environmental health issues related to lead-based paint, indoor air quality, and integrated pest management.

> **R6:** "Chronic diseases such as asthma, cardiovascular diseases, and diabetes are linked to air pollution. We will provide education on a variety of environmental hazards to *promotoras*, parents at elementary and middle schools, and pregnant women," said Genny Carillo, MD, of Texas A&M University School of Public Health. "The education will provide participants the knowledge needed

to identify indoor and outdoor pollutants, harmful chemicals in pesticides used at home, and how they can change or control them without exposing their children to the damaging effects."

R6: "The Southwest Center for Pediatric Environmental Health is very pleased to hear that we have been awarded this grant. It will serve to augment outreach to disadvantaged children on the border from El Paso to Brownsville," said Director Stephen Borron, MD. "Based at Texas Tech University Health Sciences Center in El Paso, we have partnered with colleagues from the University of Texas Rio Grande Valley School of Medicine to extend our reach. The funds will go to production of training guides for *promotoras*, as well as two *promotora* workshops. It will likewise support the development of e-learning modules to be used in their new senior medical student elective on pediatric environmental health."

R9: "Mariposa Community Health Center is excited to have been awarded this funding. Protecting our children by ensuring a healthy living environment is essential to their long-term health and well-being," said Ed Sicurello, CEO, Mariposa Community Health Center. "These funds will provide education to Community Health Workers along the U.S./Mexico border to assist them in identifying environmental pollutants and train parents and caregivers in appropriate methods to reduce or eliminate exposure within their homes."

Testimonial R9: "Families in Nogales, Arizona are very happy with the healthy homes evaluation and especially with the smoke alarms installed by Sonora Environmental Research Institute, Inc. (SERI) staff. Many families mentioned that Nogales does not have many children's environmental health programs available to low-income families, and they are grateful for this opportunity to participate in the program."- Jacobo Sandoval, SERI Program Manager

Many of these projects are establishing new ways of improving current environmental health programs and initiatives for agencies who work within communities located in the U.S.-Mexico border region. These projects will train nearly 350 specialists, including community health workers, childcare givers and medical providers, and reach over 2,000 community members on environmental health topics such as improving indoor air quality, reducing lead-based paint exposure and implementing integrated pest management strategies. Through these projects, and continued leadership from local communities along the 2000-mile border, children's environmental health will continue to improve.

Responding to Zika Threat Along the Border

Besides the shared environment between the U.S. and Mexico along the border, the Border 2020 Program also recognizes that, "[t]he movement of people and products between the two countries creates a unique binational environment for preventing and controlling diseases spread through food and water, from insects or animals, and between people" (Center for Disease Control, 2018). In response to these risks, Border 2020 has supported efforts to increase awareness and provide training on the use of integrated pest management to prevent the spread of vector-borne diseases, like zika transmitted by mosquitos.

In Fall 2016, two binational environmental health conferences on vector-borne diseases were held in Mexicali, Baja California and Nogales, Sonora. Partners included: Border 2020 and its partners, Autonomous University of Baja California (UABC), Technical Institute of Nogales (ITN), El Colegio de la Frontera Norte (COLEF), Center for Disease Control (CDC) and their Mexican counterpart (El Centro Nacional de Programas Preventivos y Control

de Enfermedades [CENAPRECE]), among others. Over 360+ people attended, such as medical students, faculty, health practitioners, government officials, and 30 vector borne disease experts. Key topics included preventive measures to combat Zika and other vector-borne diseases, integrated pest management strategies, and the appropriate usage of insect repellants.

In 2017, to confirm long-term impact of the events, the venue hosts (UABC and ITN) contacted the attendees and learned three key findings:

After the symposia, three out of four respondents shared the environmental and public health information they learned with people they knew (Figure 1).

In addition, more than half of all respondents reported they now read the label prior to using insect repellents. When asked on which strategies they have implemented to protect themselves from mosquitos and ticks, many of the attendees listed wearing long sleeved shirts, applying mosquito repellent directly to the skin and using mosquito nets.

Of critical importance, nearly half of attendees have started pouring standing water out of flower pots to eliminate mosquitos' eggs, thereby reducing breeding habitats.

As seen by the evaluation, the conferences have increased knowledge and influenced behavior. To learn more about these events, please visit the U.S.-Mexico Border 2020 webpage.

Teaming up to Address Mosquito-Border disease in Brownsville, Texas.

In 2016, the Zika outbreak in the continental United States emerged as a significant threat to the public. In November of that year, the City of Brownsville, Texas, became the first case of the Zika virus transmitted by a mosquito within the state. The City worked with the Center for Disease Control (CDC), Texas Department of State Health Services (TDSHS), Cameron County and Brownsville's Health Departments to learn more about the transmission and precautions for the public to take.

In 2017, EPA partnered with the City of Brownsville Health Department to identify hotspots and the factors that led to the spread of the Aedes aegypti mosquito. The project took a holistic approach to identify the underlying conditions that allow mosquito breeding and how to prevent it. The project mapped the risk areas within the city by looking at existing environmental data coupled with socioeconomic and mosquito data (Figure 1). To date, the city is using a crowdsource application platform in which residents can report potential mosquito breeding sites and upload georeferenced photos. The website also provides recommended actions that residents can take to combat mosquito risk.

> "We combined environmental data (land cover, precipitation, and temperature) with socioeconomic and mosquito activity data in order to paint a more accurate picture of risk. To our knowledge, this is the first vector mitigation study to take into account both 1x1 meter land cover data and socioeconomic determinants," said Pai-Yei Whung, Ph.D., the project's lead and an EPA senior scientist.

The City of Brownsville Health Department is also working with *promotoras*, who serve as public community liaisons, to educate residents through a train-the-trainer model. The project is ongoing and researchers at EPA have presented their initial findings at a conference and recently published a literature review.